

REMARKS

The Office action objects to claim 24 because of identified informalities. Applicants have amended the claim as necessary to eliminate the bases for such objection, the reconsideration and withdrawal of which are therefore respectfully requested.

The Office action rejects claim 32 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Reconsideration and withdrawal of this rejection are respectfully requested for the following reasons.

Applicants regret what is clearly a typographic error underlying this rejection. The claim language in question has been corrected to recite "the ion conducting membrane is exposed to a polar and hydrogen-bonding solvent." The same error and correction are present in claim 35. Support for this correction can be found at least in the following passages of the publication of the present application, with emphasis added:

[0018] The preparation of a membrane electrode assembly according to the invention can be described as follows: An ion-conducting membrane is pre-swollen in a solvent such as water. Care is taken that the membrane remains in a swollen, plasticised state characterized by an increased surface energy and more hydrophilic surface during the MEA assembly process. The effects of swelling on the mechanical and surface properties of the membrane can be readily varied by the choice of solvent.

[0019] For example, polar and hydrogen-bonding solvents will better swell and thus more greatly influence the mechanical and surface properties of membranes containing polar and hydrogen-bonding functional groups like acidic, basic, or

amphoteric ones. The extent of swelling of the membrane can be readily controlled by methods known to those art, including the volatility of the chosen solvent, the exposure time to the solvent and its concentration, the means of solvent exposure, the atmosphere to which the membrane is exposed to after swelling, and the duration of this exposure prior to hot-pressing of the MEA. In one embodiment, a coating of catalyst may be applied to the membrane prior to MEA assembly by means of spraying, dipping, sputtering or other methods known in the art.

The Office action rejects claims 13, 16, 19, 21, 26, 31, 32, 35, and 36 under 35 U.S.C. 112, second paragraph, as being indefinite. Reconsideration and withdrawal of this rejection are respectfully requested for the following reasons.

Of those rejected, claims 13, 16, 19, 31, and 36 are canceled. The remaining rejected claims have each been amended to eliminate the bases for this rejection.

The Office action rejects claims 13-16, 19, 21-29, 31, 33, 34, and 36-38 under 35 U.S.C. 102(b) as being anticipated by *Radiation-grafted membrane/electrode assemblies with improved interface* (Huslage et al.). Reconsideration and withdrawal of this rejection are respectfully requested for the following reasons.

Of those rejected, claims 13-16, 19, 29, 31, and 36 are canceled. Of the rejected claims remaining, claims 21 and 37 are independent, and each of the remaining rejected claims depends from one of such two claims.

Claim 21 now further recites that the duration of the re-swelling step is 4-5 hours. Claim 37 now further recites that the re-swelling step is performed using water at room

temperature. The feature newly added to claim 21 can be found at least in paragraph [0012], and the feature of claim 37 at least in paragraph [0031].

The applied Huslage et al. reference fails to disclose the features now recited in these claims, and by extension all claims that depend therefrom.

Underlying this distinction is the fact that the present inventors have newly discovered that the water content of the membrane during the hot-pressing step is desirably controlled. It appears to have been unknown to Huslage et al. in particular, and the broader prior art in general, that this parameter bears directly on producing an optimized MEA interface, favorable electrochemical properties, and improved fuel cell performance.

Preferred examples to control this content of water are given in PCT application underlying the present U.S. national stage on page 4, last paragraph to page 5, first paragraph, as well as page 12, second paragraph. On pages 13 and 14 of the PCT publication, further examples are given to prepare the membrane under pre-swelling condition in order to control the water content during subsequent hot-pressing (see, e.g., Working Example 1, page 13, fourth paragraph and Working Example 2, page 14, second paragraph).

Contrary to the novel teachings of the present approach, Huslage et al. provide no indication that the control

of water content in the respective membranes is of any concern whatsoever. Huslage et al. teach performing the pre-swelling prior to the hotpressing in boiling deionized water. There is no other detail given, nor is any further mention made of this step. There is nothing more than the passing reference on page 249, left column, lines 1 to 4 that the membranes is re-swelled in boiling deionized water. Huslage et al. provide no information whatever as to the time span for such re-swelling step. This makes absolutely clear that Huslage et al. have no understanding of the impact of such step.

Accordingly, the present applicants have amended the independent claims to specifically recite time and temperature parameters of the re-swelling step. In addition to such independent claim amendment, Applicants have also added new claim 39 depending from claim 21. Claim 39 recites that the re-swelling is performed in water at approximately 80°C, another detail clearly absent from the disclosure of the Huslage et al. reference.

In light of the clear failure of Huslage et al. to offer any indication of knowledge of the significance of the details of the re-swelling step, and the resulting absence of any teaching of Huslage et al. as to details now recited in the amended independent claims and new claim 39, Applicants suggest that the present anticipation rejection cannot be maintained.

Reconsideration and withdrawal of such rejection are therefore respectfully requested.

The Office action rejects claims 17 and 20 under 35 U.S.C. 103(a) as being unpatentable over *Radiation-grafted membrane/electrode assemblies with improved interface* (Huslage et al.) in view of US 6,465,120 (Akita et al.). Applicants have canceled such claims, and reconsideration and withdrawal of this rejection are therefore respectfully requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future submissions, to charge any deficiency or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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